

Name: Key TP: _____

CW#83H: Reg. Prism SA and Vol. & Mixed Review

CRS	Geometry Content
Objective	14.1-14.4 – Find surface area/volume of regular prism, right cylinder, and prism

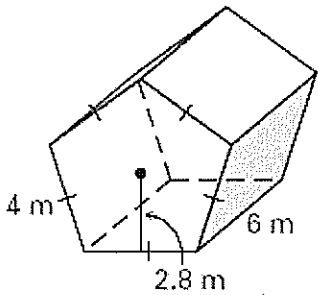
Volume: The amount of space an 3D object can contain.

Surface Area: the area of the faces on a 3D object.

Regular Polygons: Area of base * height

Regular Polygons: $SA = \frac{1}{2} P(h)$ or $2B + P(h)$

Example 1: Use the pentagonal prism to find:



Area of Base
 $= 5(\frac{1}{2})(a)(s)$
 $= 5(\frac{1}{2})(2.8)(4)$
 $= 28$

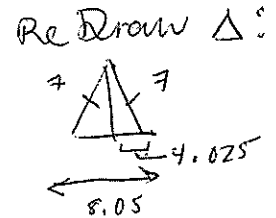
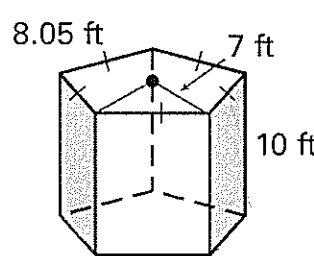
Surface Area:

$SA = 2B + \text{Perimeter}(\text{height})$
 $2(28) + (4 \times 5)(6)$
 $= 176 \text{ m}^2$

Volume:

$28 \times 6 = 168 \text{ m}^3$

Example 2: Use the pentagonal prism to find:



Surface Area:

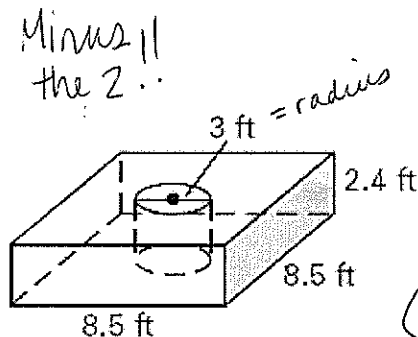
Area of Base
 $5(\frac{1}{2} \times 8.07 \times 8.05)$
 $= 162.41$

$SA = 2B + \text{Per.}(\text{height}) = 2(162.41) + (8.05 \times 5 \times 10)$
 $= 727.32 \text{ ft}^2$

Volume:

~~$(162.41)(10) = 1624.1$~~
 1151.86

Example 3: Find the volume of the solid. Round your answer to two decimal places, if necessary.



105.54 ft^3

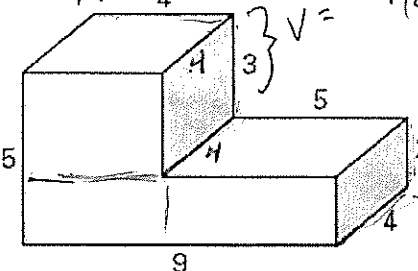
105.54 ft^3

$(8.5)^2 \times 2.4$

$173.4 \text{ ft}^3 - (\pi)(3)^2(2.4)$
 $= 67.86 \text{ ft}^3$

Example 4: Find the volume of the solid by determining how many unit cubes are contained in the solid.

Several approaches

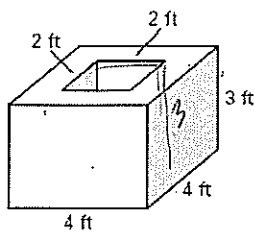


$16 \times 3 = 48 \text{ units}^3$
 $+ (9 \times 4) 2 = 72 \text{ units}^3$

120 units^3

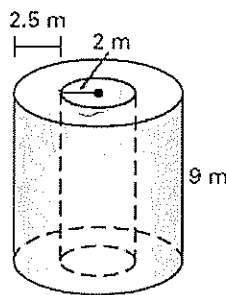
PUSH IT TO THE LIMIT.

1. Find the surface area of the solid. Round your answer to two decimal places.



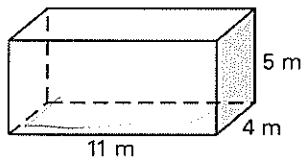
$$\begin{aligned} & \text{outer sides} \\ & + 2(16 - 4) + 4(12) \\ & \text{inner sides} \\ & + 4(6) \\ & = 96 \text{ ft}^2 \end{aligned}$$

2. Find the volume of the right cylinder. Round your answer to two decimal places, if necessary.



$$\begin{aligned} r &= 2.5 - 2 = 0.5 \\ \pi r^2 \times h &= (0.5)^2 \pi (9) \\ &= 0.25 \pi (9) \\ &= 2.25 \pi \\ &= 7.06858 \text{ m}^3 \end{aligned}$$

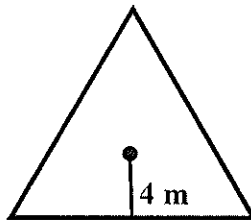
3. Find the surface area and volume:



$$\begin{aligned} \text{Volume} &= 11 \times 4 \times 5 \\ &= 220 \text{ m}^3 \end{aligned}$$

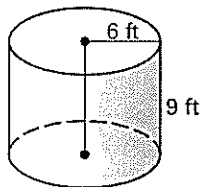
$$\begin{aligned} 2(44) + 2(4 \times 5) + 2(11 \times 5) \\ 88 + 40 + 110 &= 238 \text{ m}^2 \\ \text{SA} \end{aligned}$$

3. Find the area of the regular polygon. Leave your answer in simplest radical form.



$$48\sqrt{3} \text{ m}^2 \approx 83.13 \text{ m}^2$$

5.



- a. Find the surface area:

$$2\pi r^2 + 2\pi r h$$

$$72\pi + 108\pi$$

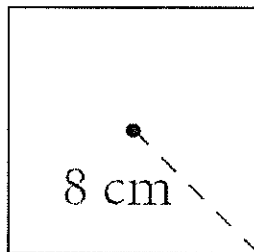
$$180\pi \approx 565.49 \text{ ft}^2$$

- b. Find the volume:

$$= \pi r^2 \times \text{height}$$

$$= 36\pi \times 9 = 324\pi \approx 1017.88 \text{ ft}^3$$

6. Find the area of the regular polygon and round to the nearest tenth.

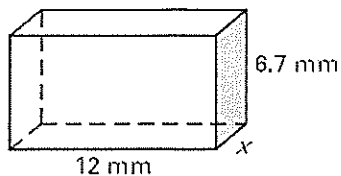


$$= 128 \text{ cm}^2$$

PUSH IT TO THE LIMIT.

7. Find the length x using the given volume V .

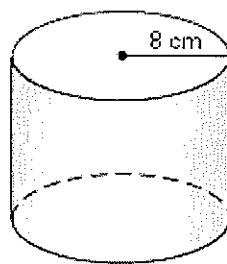
$$V = 281.4 \text{ mm}^3$$



$$281.4 \div (12 \cdot 6.7)$$

$$x = 3.5 \text{ mm}$$

8. Solve for x given the surface area S of the right prism or right cylinder. Round your answer to two decimal places. $S = 1000 \text{ cm}^2$



$$1000 \text{ cm}^2 = 2\pi r^2 + 2\pi rh$$

$$r = 8$$

$$1000 = 128\pi + 16x\pi$$

$$-128\pi$$

$$\frac{597.87}{16\pi} = \frac{16\pi x}{16\pi}$$

$$x \approx 117.39 \text{ cm}$$

9. What is the area of a regular pentagon whose apothem is 25.1 mm and perimeter is 182 mm?

A. 913.6 mm^2

B. 2284.1 mm^2

C. 3654.6 mm^2

D. 4568.2 mm^2

10. The area of a regular octagonal garden is 1235.2 yd^2 . The apothem is 19.3 yd. What is the perimeter of the garden?

$$SA =$$

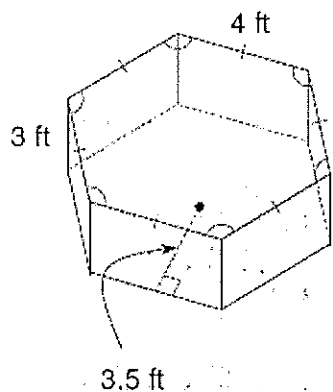
A. 128 yd.

B. 154.4 yd.

C. 186.6 yd.

D. 192 yd.

11. Find the volume. Round to the nearest tenth if necessary.



$$126 \text{ ft}^3$$

12. Sketch the figure and find the volume. A cylinder with a radius of 4 yd. and a height of 5 yd.

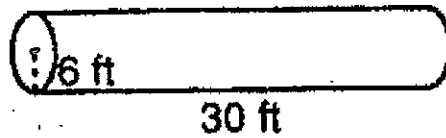
$$251.3 \text{ yd}^3$$

PUSH IT TO THE LIMIT.

13. Sketch the figure and find the volume. A square prism of height 6 km along each edge of the base and 5 km tall.

$$180 \text{ km}^3$$

14. Find the volume **and** surface area of the right cylinder.

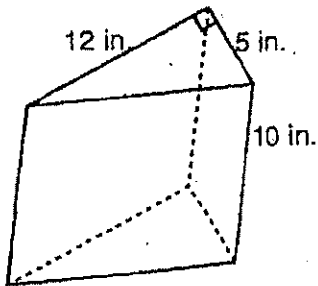


$$2\pi r^2 + 2\pi rh$$

$$\text{SA: } 72\pi + 360\pi = 432\pi \text{ or } 1357.17 \text{ ft}^2$$

$$\text{VOL: } \pi r^2 \cdot h = 36\pi \times 30 = 1080\pi \text{ ft}^3 \text{ or } 3392.92 \text{ ft}^3$$

15. Find the surface area of the triangular prism.

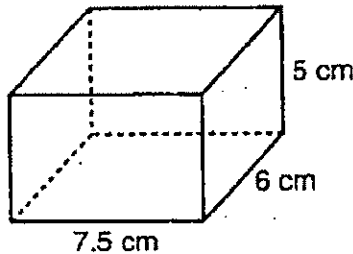


$$\left(\frac{1}{2}\right)(5)(12) \times 2 = 60$$

$$+ 5(10) + 2(12 \times 10)$$

$$50 + 240 + 60 = 350 \text{ in}^2$$

16. Find the surface area of the rectangular prism.

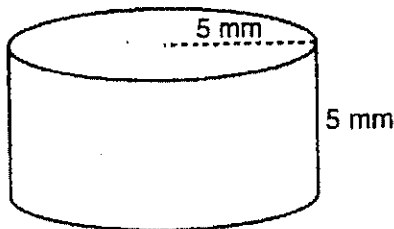


$$2(7.5)(6) + 2(5 \times 6) + 2(7.5 \times 5)$$

$$90 + 60 + 75$$

$$= 225 \text{ cm}^2$$

17. Find the surface area of the right cylinder.

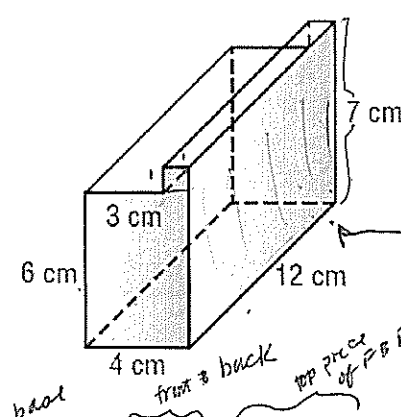


$$2\pi r^2 + 2\pi rh$$

$$50\pi + 50\pi = 100\pi \text{ mm}^2$$

$$\text{or } 314.16 \text{ mm}^2$$

18. Find the surface area of the composite figure.



$$48 + 48 + 2$$

$$+ 84 + 72$$

$$+ 36 + 24$$

$$= 314 \text{ cm}^2$$

Labels in diagram: base, front & back, top piece of PB B, side, bottom side, top side.

$$48 + 2(24) + 2(1) + (7 \times 12) + (6 \times 12)$$

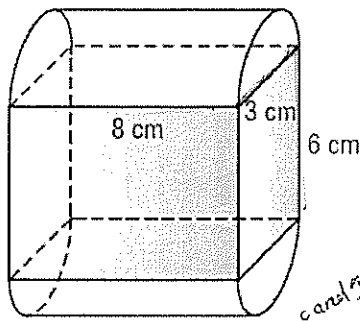
$$+ (3 \times 12) + 2(1 \times 12)$$

↑ top skinny lid

PUSH IT TO THE LIMIT.

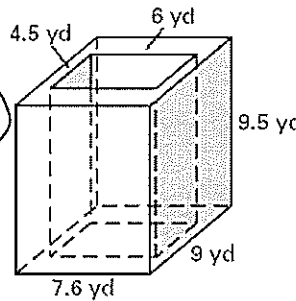
odd <

19. Find the volume of the composite figure.



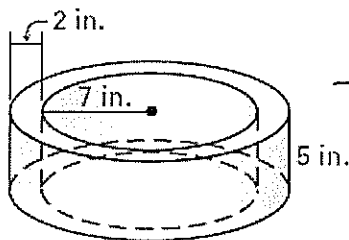
$$\begin{aligned}
 (8 \times 3) 6 &= V_{\text{rect}} \\
 &= 144 \text{ cm}^3 \\
 &+ 56.55 \text{ cm}^3 \\
 &= 200.55 \text{ cm}^3 \\
 &2(V_{\text{rect}}) \\
 &\frac{1}{2}(\pi r^2)(h) \\
 &\left[\frac{1}{2} \pi (1.5)^2 (8) \right] \\
 &= 18\pi \text{ or } 56.55
 \end{aligned}$$

20. Find the volume of rectangular prism. Round your answer to two decimal places.



$$\begin{aligned}
 V_1 &= 7.6 \times 9 \times 9.5 \\
 &= 649.5 \text{ yd}^2 \\
 V_2 &= 4.5 \times 6 \times 9.5 \\
 &= 256.5 \\
 &393 \text{ yd}^3
 \end{aligned}$$

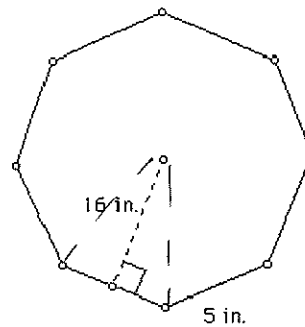
21. Find the volume of right cylinder. Round your answer to two decimal places.



$$\begin{aligned}
 V_1 &= 9^2 \cdot \pi \cdot 5 \\
 &= 1272.35 \\
 V_2 &= 7^2 \cdot \pi \cdot 5 \\
 &= 769.69
 \end{aligned}$$

$$502.66 \text{ in}^3$$

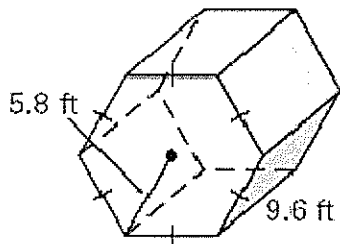
22. Find the area and perimeter of the regular hexagon.



$$P = 6(5) = 30 \text{ in.}$$

$$A = \left(\frac{1}{2} \cdot 16 \cdot 5 \right) 6 = 320 \text{ in}^2$$

23. Find the volume and surface area



24. **Surface Area of a Prism** A rectangular prism has a base with a width of x units and a height of y units. The depth of the prism is z units. Write the surface area S in terms of x , y , and z . (Sketch the figure!)

PUSH IT TO THE LIMIT.